AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Mechanical Engineering

Course Information	
Course Code and Name:	ME221: Thermodynamics-I
Credit Hours**:**	**3 (**3 Lecture + 1 Tutorial)
Prerequisites:	CHEM 103 General Chemistry & MATH 106 Calculus- II

Course Description
Introduction to engineering thermodynamics, First law, second law, system and control volume analysis, Properties and behavior of pure substances, applications to thermodynamic systems operating in a steady state and transient processes. Heat transfer mechanisms, Typical power producing cycles and refrigerators.

Textbook			
Title	THERMODYNAMICS - AN ENGINEERING APPROACH		
Authors	Yunus A. Cengel and Michael A. Boles		
Publisher	McGraw Hill Higher Education	Year and Edition	2011, 7th edition

Course Contents
Thermodynamic properties and system of units
Thermodynamic systems, state and equilibrium
Thermodynamic process, cycle and property measurement
Work, heat and their interaction with each other
Conservation of energy (First Law of Thermodynamics)
Pure substance and its phases, phase change processes and the P-v-T surface.
Internal energy, enthalpy, thermodynamic property tables and their use, ideal gas equation of state and compressibility factor
Closed system analysis: Moving boundary work, energy balance and specific heats
Internal energy, enthalpy and specific heats of ideal gases. Internal energy, enthalpy and specific heats of solids and liquids.
Open and steady flow system analysis: Conservation of mass, flow work and flow energy.
Examples of steady flow devices. Energy analysis of transient (unsteady flow) processes.
The Second Law of Thermodynamics, thermal energy reservoirs, refrigerators and heat pumps, perpetual motion machines.
Reversible and irreversible processes. The Carnot cycle, Carnot principle, the thermodynamic temperature scale, Carnot type heat engine, refrigerator and heat pump
Entropy, entropy diagram, isentropic process
More on entropy (entropy diagrams, the entropy change, the *Tds* equations, isentropic efficiencies

Academic Coordinator	Signature
Dr. Syed Muhammad Fakhir Hasani	

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